



ACTION INDONESIA

GLOBAL SPECIES MANAGEMENT PLAN

FOR ANOA, BANTENG AND BABIRUSA



Cover photo: Banteng. Photo: Taman Nasional Alas Purwo

ANNUAL REPORT 2022

ACTION INDONESIA FOUNDING MEMBERS:



World Association of
Zoos and Aquariums
WAZA | United for
Conservation

ASSOCIATION
OF ZOOS &
AQUARIUMS



Asian
Wild
Cattle
Specialist
Group



Species Survival Commission



IUCN/SSC: Wild Pig Specialist Group

Achievements of Action Indonesia in 2022

In a nutshell:

Anoa, banteng and babirusa all occur within Indonesia and are under threat of extinction due to hunting and habitat loss. The Action Indonesia Partnership was created in 2016 with the aim to promote international collaboration to ensure the long-term survival of these species by a combination of *ex situ* and *in situ* activities. This used WAZA's Global Species Management Plans (GSMPs) frameworks for banteng, anoa and babirusa.

This year travel restrictions were eased, and we enjoyed the opportunity to meet in person, both with our colleagues and partners in Indonesia, and with our international partners during conferences in Europe and the US. We look forward to conducting in-person training and working together more closely to conserve anoa, banteng, babirusa and Sumatran tiger in 2023. We are very thankful for your continued support, partnership and collaboration. Thanks to you the Action Indonesia GSMPs were able to progress towards our aims in 2022. Below is a summary of our achievements:

- The GSMPs successfully completed their planning for the next masterplan phase 2022-2025.
- Genetic sampling of anoa, banteng and babirusa in Indonesian zoos has been completed and the data is being analysed
- The GSMP, PKBSI and Alas Purwo National Park implemented the second year of camera trapping to monitor banteng populations in a priority area for the species in East Java.
- Continued breeding of GSMP species has occurred following the second set of breeding and transfer recommendations developed and distributed to Indonesian zoos in 2018.
- The fourth Action Indonesia Day was held on August 14th to raise awareness for GSMP species. Over 37 organisations got involved in a successful day of virtual events and activities.
- The GSMP and the PKBSI Education Division planned and delivered virtual husbandry training on working with tigers, and hybrid training on biosecurity in zoos to Indonesian zoo staff.
- The GSMPs were represented in the EAZA Annual conference, the SEAZA conference, Rakornas, the joint TAG Chairs meeting and the EAZA conservation forum. The GSMP also held a public webinar, which was attended by 48 people.
- We continued fundraising efforts to support GSMP activities.
- The GSMP supported the increase of population management capacity in PKBSI through the recruitment of an additional staff member (Population Management Coordinator) to coordinate the process.
- The Education, Husbandry and Population Management Working Groups increased their membership to include more members from Indonesian zoos. We appreciate their time and contribution to coordinating activities.

Thank you for your support and contributions! We look forward to continuing our collaboration.



James Burton
Chair
IUCN SSC Asian Wild
Cattle Specialist Group



Terry Hornsey
Convenor
Anoa GSMP



Joe Fors
Convenor
Babirusa GSMP



Ivan Chandra
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Corinne Bailey
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Background:

What are GSMPs?

Global Species Management Plans (GSMPs) bring together zoos, governments, and conservation organisations from multiple regions to achieve globally agreed *ex situ* and *in situ* conservation goals for a species. The GSMPs are administered by the World Association for Zoos and Aquaria (WAZA) and run by committees of representatives of the regional zoo associations participating in the collaboration.

Action Indonesia GSMPs

The partners of the Action Indonesia GSMPs collaborate for the conservation of the threatened Indonesian taxa; **anoa** (*Bubalus depressicornis* and *B. quarlesi*), **banteng** (*Bos javanicus*) and **babirusa** (*Babyrusa* spp.; three species). We also work closely with the **Sumatran tiger** (*Panthera tigris sumatrae*) GSMP to align our activities. These GSMPs use the One Plan Approach to combine the skills, resources and expertise of both the zoo community and *in situ* practitioners. The coordination of the GSMPs is carried out by the Indonesian Zoo and Aquarium Association (PKBSI) and the IUCN SSC Asian Wild Cattle Specialist Group.

In this report, we detail our achievements in three main areas of activity that align to the following goals:

1. *Ex situ* conservation: Healthy back up *ex situ* populations fit for reintroduction
2. Education: Action and support for conservation of target species
3. *In situ* conservation: Stable and safe *in situ* populations



The four GSMP taxa (left to right): anoa (Photo: Point Defiance Zoo & Aquarium), banteng (Photo: Zoo Wroclaw), babirusa (Photo: Taman Safari Indonesia Bogor) and Sumatran tiger (Photo: Surabaya Zoo)

Your contributions in 2022

The achievements and activities in 2022 were only possible due to your generous contributions and support. Support included financial contributions as well as staff time, technical input and the sharing of expertise.

This year, institutions freed work time to allow staff to contribute to various GSMP activities, including the significant time contribution in planning the next phase of the masterplan. Staff also contributed to presenting in the virtual training sessions, raising awareness and funds, coordinating the analysis of genetic samples, presenting at conferences and monitoring breeding and transfer recommendations. This in-kind support provided by your institutions or organisations is shown in Table 1.

Table 1 also shows the GSMP activities that contributions by your institutions and organisations have funded or will fund. The hard work of all those involved in activities and the amazing generosity of our supporters is a huge credit to the collaborative partnership of the Action Indonesia GSMPs and the motivation of our partners.

The first section of Table 1 shows contributions to GSMP unrestricted funding. Unrestricted funding is important to assist with the overall functioning of the GSMPs and ensure funds are available in the case of urgent activities; these funds are allocated by approval from a majority of the Working Group leaders. Table 1 also shows restricted funding – the contributions to specific activities.



Banteng spotted on camera trap image in Alas Purwo National Park, Credit: Alas Purwo National Park

Table 1 Action Indonesia Partner and supporter contributions; all funding, technical and in-kind support for the GSMPs in 2022

Institute/Organisation/Individual	Contribution
Unrestricted funds	
Zoological Society of London, UK	Funds to be used for projects identified as priorities by Working Group leaders.
Marcus Burkhardt, Germany	
Zoo Miami, USA	
Cologne Zoo, Germany	
West Midland Safari Park, UK	
Tiergarten Neurenburg, Germany	
San Diego Zoo Wildlife Alliance, USA	
AllwetterZoo Münster, Germany	
Saint Louis Zoological Park, USA	
Nashville Zoo, USA	
Memphis Zoo, USA	
Restricted funds	
Chester Zoo, UK	Coordination of the Action Indonesia GSMPs; salary and travel of AWCSG PO and AWCSG Chair; banteng <i>in situ</i> population monitoring, Chester Zoo Scholarship for PKBSI-GSMP officer.
Re:wild, USA	Coordination of the Action Indonesia GSMPs; salary and travel of AWCSG Chair
Nashville Zoo, USA	Sulawesi <i>in situ</i> population monitoring
CERZA, France	Sulawesi <i>in situ</i> population monitoring
Copenhagen Zoo, Denmark	Genetic sampling and analysis of <i>ex situ</i> populations of anoa, banteng and babirusa in Indonesian Zoos
ZSL, UK	PKBSI capacity building in population management and animal welfare MRes support for PKBSI-GSMP Programme Officer
ARTIS Zoo, Netherlands	<i>In situ</i> population monitoring and animal welfare MRes support for PKBSI-GSMP Programme Officer
Zoo Wroclaw, Poland	Banteng <i>in situ</i> population monitoring
Zoo Leipzig, Germany	Salary and travel of AWCSG Chair
Taman Safari Indonesia Bogor, Indonesia	Contribution to PKBSI-GSMP Programme Officer salary
Batu Secret Zoo, Jatim Park, Indonesia	Contribution to PKBSI-GSMP Programme Officer salary
Alas Purwo National Park, Indonesia	Banteng <i>in situ</i> population monitoring; staff time and funds
In-kind support	
Chester Zoo, UK	Staff time coordinating training in husbandry and education, leading the education and husbandry WG masterplan development
Copenhagen Zoo, Denmark	Mentoring in population genetics for PKBSI and genetic technical advice, genetic analysis of <i>ex situ</i> samples. Leading the Banteng <i>in situ</i> and Genetics WG masterplan development.
Bali Safari Park, Taman Safari Indonesia Bogor, Bali Zoo, Taman Mini Indonesia Indah, Jatim Park, Taman Impian Jaya Ancol, Taman Safari Indonesia Prigen, Ragunan Zoo, Bali Bird Park, Gembira Loka Zoo, Indonesia	Staff time in becoming members of Education, Husbandry and Population Management Working Groups
EAZA Executive office, Netherlands; San Diego Wildlife Alliance, USA	Population mentoring and support for new population management officer and coordinators.
ZSL, UK; IPB University Bogor + Bali Zoo, Indonesia	Biosecurity training for Indonesian zoo
Taman Safari Indonesia Bogor, Taman Safari Indonesia Prigen, Ragunan Zoo, Batu Secret Zoo, Surabaya Zoo, Indonesia	Hosting the GSMP coordination team during in person zoo visits
Conservation Optimism	Staff time hosting the GSMP webinar.
National Research and Innovation Agency, Indonesia	Supporting genetic monitoring quality work (field and lab)
Taman Safari Prigen, Taman Safari Bogor, Surabaya Zoo, IPB University Bogor, Indonesia	Staff time for studbook keepers for banteng, anoa, babirusa and Sumatran tiger respectively.

Thanks to all Indonesian zoos and institutions that participated in the breeding and recommendations process, and to all the zoos and institutions around the world that participated in Action Indonesia Day 2022. Thanks also to the BKSDA Sulawesi Selatan, Faculty of Forestry Universitas Hasanuddin, and Baluran and Meru Betiri National Parks in East Java for hosting the GSMP coordination team in November.

Action Indonesia GSMP Masterplan 2022-2025 Development

In 2022, the GSMPs went through an important process of reflecting and reviewing progress we had made in the masterplan period between 2018-2021 and looking forward to align targets and plan activities for the next exciting phase of the Action Indonesia partnership. This was a year long process, involving Working Group leaders and members, Indonesian zoos, PKBSI and KKH (Fig. 1).

At the end of the process, the plans were shared in a virtual plenary held on Friday 16th September. The plenary was hosted by the Ministry of Environment and Forestry Indonesia and attended by 120 participants from Indonesia, Europe and the US, including representatives from the Indonesian government and national parks, the Indonesian Zoo Association, EAZA, and the IUCN SSC.

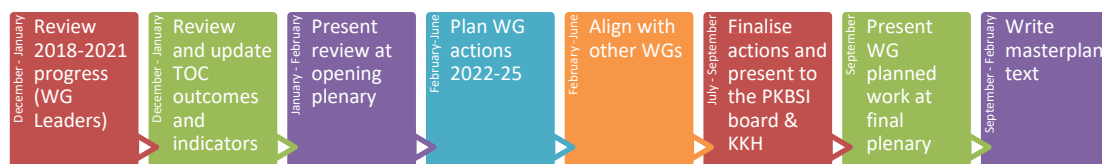


Fig. 1: Diagram of masterplanning process timeline in 2022

The plenary was a great opportunity for the working groups to share their hard work and ambitious plans to help conserve these species in the coming years. Working Group members presented on breeding and transfer recommendations for the four species, *in situ* and *ex situ* genetics, education and awareness raising, husbandry training and *in situ* population monitoring. The planning process has been a huge collaborative effort, with each working group reviewing their overall aims and objectives, and working together to brainstorm and define activities, roles and responsibilities and indicators to monitor progress.

The new phase is an opportunity to grow and progress in specific key areas, highlighted broadly below:

- **Education:** Up to 2022, the Education working group made great progress in raising awareness for anoa, banteng and babirusa through beginning a global awareness raising day, Action Indonesia Day, building a database of Education resources and training over 150 zoo professionals. Between 2022 and 2025, this capacity building and awareness raising will continue, and reach will be expanded to researching and addressing drivers of threats to the species *in situ*.
- **Husbandry:** From 2018-2022, the Husbandry working group succeeded in developing and publishing husbandry recommendations for banteng and anoa, building a husbandry training framework and building capacity through training 200 zoo staff. In the next phase, the working group will develop guidelines for tiger husbandry and work with the population management working groups in tailoring

husbandry advice to support successful breeding following recommendations. It is recognized that more integrated husbandry training would be beneficial and the group aims to equip more Indonesian trainers and develop increased links between zoos for advice and best practice sharing.

- **Population management process:** By the end of 2022 there was successful breeding following recommendations and good uptake and participation in the recommendations by the Indonesian zoos. However, we realised that this process could be improved for increased success. Multiple actions will address this during the next phase, including the recruitment of a new staff member to coordinate the recommendations with zoos, increased capacity building for Indonesian studbook keepers, quarterly check-ins with zoos on their progress, a faster review and turnover of recommendations (every 18 months), and more inclusion of the local government institution from the beginning of the process.
- **Banteng *in situ*:** Between 2018-2022, we developed strong links with a further park in East Java and conducted two years of park wide monitoring of banteng populations. We now have data that can be compared between two of the four national parks that have Javan banteng populations. In the next phase, we will prepare more fully for a future metapopulation approach by expanding the collation of comparable population monitoring data in all four parks and sampling the genetics of banteng in each park to get a clear overview of the island wide population.
- **Sulawesi *in situ*:** In the last phase there was limited progress in monitoring babirusa and anoa populations. The next phase will focus more on camera trapping and collecting monitoring data for at least one site in Sulawesi, and developing an island wide monitoring network following comparable methodology as we build relationships.
- **Genetics:** In the last phase the genetic working group made great strides in sampling anoa, banteng and babirusa individuals in Indonesian zoos. This will be integral to informing breeding recommendations in the future. In the next phase we aim to expand this to sampling the Sumatran tiger zoo population, as well as the *in situ* banteng population.

These plans represent a major step forwards in the GSMPs and reflect the large amount of progress that we have made in building trusting relationships with our partners in the Indonesian government, PKBSI and with zoos and *in situ* organisations. This progress has allowed us to build ambitious goals and work plans that require an ambitious level of funding, and fundraising activities will increase to support these projects, particularly the *in situ* monitoring and genetic sampling components.



Dr Gono Semiadi and Keni Sultan presenting at the GSMP Plenary. Credit: PKBSI

1. Ex situ conservation: Healthy back up ex situ populations fit for reintroduction

Genetic Population Assessment of anoa, banteng and babirusa in Indonesian zoos

In order that the greatest genetic diversity can be maintained in the *ex situ* populations, genetic assessment is required to verify the studbook data, determine the genetic make-up of the individuals and determine the geographical origin and relatedness of the wild caught individuals. The Indonesian Zoos and Aquariums Association (PKBSI), in collaboration with the National Research and Innovation Agency (BRIN), the Ministry of Environment and Forestry (KLHK) and the GSMP Genetics Working Group, is leading on the sampling and genetic assessment of the founder animals of the Indonesian zoo populations of anoa, babirusa and banteng. This will help guide the breeding and transfer recommendations to retain as much genetic diversity as possible.

The total number of founder individuals identified for sampling includes 30 banteng, 30 babirusa and 25 anoa, collected from the following Indonesian zoos: Bandung Zoological Garden, Taman Safari Indonesia Bogor, Batu Secret Zoo, Taman Safari Indonesia Prigen, Surabaya Zoo, Ragunan Zoo, Gowa Discovery Park, Citra Satwa Celebes and Bali Safari Park. Sample collection started after obtaining a permit from the Director General of Nature Resources and Ecosystem Conservation (KSDAE) through decree number: SK.226/KSDAE/SET.3/KSA.2/11/2020 on 17th November 2020 and extended through decree number: SK.784/KSDAE/SET.3/KSA.2/8/2021 on 4th August 2021. It was completed at the beginning of 2022.

Following completion of the sampling and genome sequencing, the data is being analysed by BRIN and Copenhagen Zoo. Initial results in developing genetic profiles of the zoo populations of anoa and babirusa have identified individuals with high inbreeding coefficients (Fig 2). As figure 2 shows, around 10% of babirusa zoo population (3/29) have a high inbreeding coefficient (>0.4), compared to 4% of the anoa zoo population (1/24). Locating highly inbred individuals will inform breeding and transfer recommendations.

The aim of the genetic work under PKBSI and the GSMP is to characterize the genetic diversity of both wild populations and *ex situ* populations in Indonesian, European and North American Zoos. Genetic sample collection of banteng and anoa is also underway in European zoos, which will allow joint analysis of the EEP and Indonesian zoo population.



Anoa blood samples were collected from Citra Satwa Celebes. Credit: PKBSI

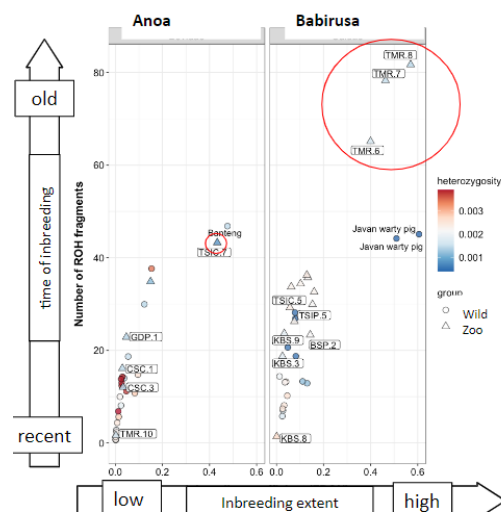
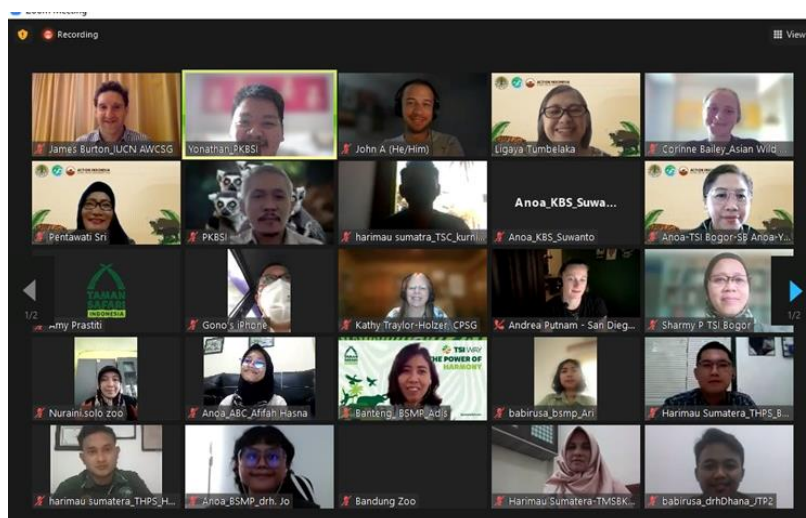


Fig. 2: inbreeding coefficient summary for anoa and babirusa. Credit: Copenhagen Zoo

Breeding and transfer recommendations

A primary aim of the Action Indonesia GSMPs is to achieve healthy backup *ex situ* populations for each species. This is particularly important for Indonesian zoos, as they have a number of founder animals, whose genetics are potentially underrepresented in the Indonesian and global zoo population. GSMP population management working groups have been working with studbook keepers and zoos since 2016 to produce cooperative breeding and transfer recommendations in Indonesia. The second set of recommendations was produced in 2018 during the second GSMP Planning Workshop. New recommended births are important steps forward in our goal of maintaining healthy global *ex situ* populations, which is critical to the long-term conservation of the species.



Zoos joining the PKBSI-GSMP call in the development of the breeding and transfer recommendations. Credit: PKBSI

As a result of the second set of breeding recommendations, six anoa, twenty-three banteng and six babirusa have been born so far, including a banteng birth confirmed in 2022 (Figure 3). Since the recommendations process began in 2016, there have now been at least 48 recommended births, including nine babirusa, ten anoa, and twenty-nine banteng. These births help to grow the *ex situ* populations towards the Indonesian National cooperative breeding targets (Table 2). Although there have been births from approximately 20% of all recommended pairings since 2018, the zoo populations of all four species are declining. It is therefore important for the GSMP to support implementation of recommendations further.

The third set of breeding and transfer recommendations was developed in 2022 for anoa, banteng, babirusa and Sumatran tiger. This process included opportunities for zoos to engage more in the process through in person visits to a number of zoos in July, a technical call in which all zoos shared their population status update and future capacity, and had the opportunity to feedback on recommendations drafts. Recommendations were also presented at the GSMP masterplan plenary in September, and to zoo directors during the Rakornas annual PKBSI meeting in November.

The agreed recommendations will be sent out to zoos with the support of the Indonesian government in January 2023. Implementation will be supported by measures outlined previously in this report, including through training and increased engagement from all stakeholders, as well as tailored husbandry advice to support successful matings and transfers.

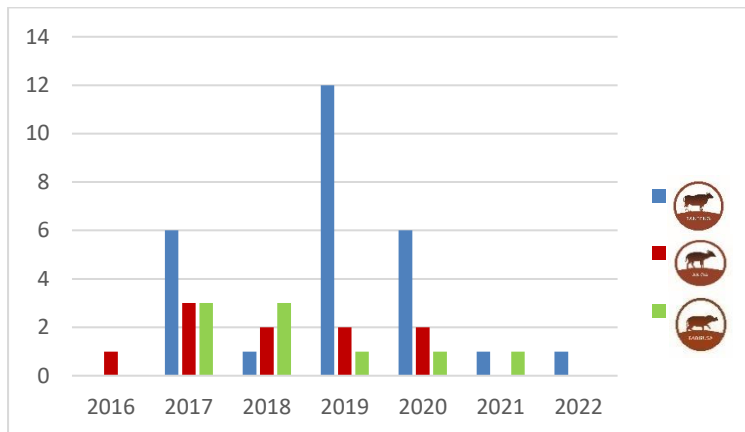


Fig. 3: Births of anoa, banteng and babirusa in Indonesian zoos following breeding recommendations.

Species	Current population (Aug 2022)	Target
Banteng	71	100
Anoa	35	75
Babirusa	70	100

Table 2: Indonesian National *ex situ* cooperative breeding targets and the current *ex situ* populations.

Building population management capacity in PKBSI:

Mia is the new PKBSI Population Management Coordinator for GSMP Programme. She will work as population biologist to support the development of the transfer and breeding recommendation process, as well as the implementation of these recommendations with Indonesian Zoos, Studbook Keepers, and international Population Biologists. She will also work with other international GSMP partners to organise training and collaborative activities. She is available for contact by email: islamiasufraha@gmail.com. This role will further increase the population management capacity and partnership in PKBSI-GSMP.



(Left to right) James, Mia and Yonathan at the SEAZA conference in Bali.

Husbandry Training

The Husbandry training working group together with the PKBSI Education and Training Division held two trainings in 2022. A virtual Tiger Husbandry Webinar was held on the 26th September. The webinar covered a range of husbandry topics including safety when working with tigers, nutrition, relationship building, enrichment and estrus behaviour, and included presenters from Point Defiance Zoo and Aquarium, Zoo Miami, San Diego Zoo Safari Park, and Topeka Zoo, moderated by Dr. drh Ligaya Tumbelaka and with translation support from Josephine Vanda Tirtayani (Gembira Loka Zoo) and Ade Diah Safitri (Bali Zoo). The two hour training had 63 participants. In 2023, an in person two day workshop will be held in Indonesia for more thorough training. This capacity building will support breeding recommendations and will be complemented by bespoke advice to zoos that have issues with breeding their tigers.

At the PKBSI annual meeting (Rakornas) in Bali in November, the Husbandry working group supported a hybrid half-day biosecurity training session. The session was held at Bali Zoo, and with participants including vets and curators from Indonesian zoos. The session included speaker Dr. drh. Ni Luh Putu Ika Mayasari from IPB university on common zoonotic diseases and the importance of biosecurity in prohibiting the spread of disease, and Amanda Guthrie from ZSL presenting on biosecurity measures for diseases including Foot and Mouth, African Swine Fever, and Avian Flu. Participants worked together to develop biosecurity risk assessments for different disease scenarios. There were 55 participants, consisting of 45 in-person and ten online participants.

Evaluation of the training demonstrates a 16% increase in participant knowledge about the biosecurity and its application within their zoos.



Participants of the biosecurity training at Bali Zoo. Credit: PKBSI

2. Education - Action and support for the conservation of target species

Global Campaign Day

The fourth annual Action Indonesia Day was held on Sunday the 14th August around the world. Action Indonesia Day is an annual global awareness raising day to maximise education efforts and communication about the species and their conservation. This continues to be a major achievement in raising awareness and in the collaboration between regions.

This year, 37 zoos and institutions from Indonesia, Europe and North America participated in Action Indonesia Day. The day was successful in spreading the word in their zoos and on social media about anoa, banteng, babirusa, and Sumatran tigers using the #ActionIndonesiaDay hashtag, and sharing educational resources including those provided on the Action Indonesia website.

Some of the activities conducted on the day included Ragunan Zoo's live webinar for 500 Jakarta High School students, artefact tables and games by Chester Zoo and Surabaya Zoo, colouring activities and conservation games in Taman Safari Indonesia Bogor and novel enrichment created by Zoo Miami. The Action Indonesia educational resources were downloaded over 250 times for use in outreach. We are proud to help shine a light on these threatened endemic species and very grateful to everyone who helped to raise awareness. Collectively, our social media posts using the #ActionIndonesiaday hashtag was seen almost 4 million times and generated almost 9000 likes.



Novel enrichment was developed by Miami Zoo volunteers. Credit, Nicole Hunnewell



500 students joined on the webinar set up by Ragunan Zoo. Credit, Ragunan Zoo



Visitors touching skulls at an interactive touch table session. Credit, TSI Bogor

Raising awareness of the GSMP

Below is a summary of our key communications to raise awareness of Action Indonesia in 2022.

Education Webinar

The Education Working Group held a webinar on the contribution of educators to the One Plan Approach conservation efforts for banteng, babirusa, anoa, and Sumatran tiger. This panel event focused on creating global awareness raising days, and was held one month before Action Indonesia Day to encourage participation. 48 participants attended the webinar, with speakers from PKBSI, Ragunan Zoo, Chester Zoo, and Zoo Miami. The session was hosted by Julia Migne of Conservation Optimism, and people joined the webinar from South East Asia (69%), Europe (17%), USA (10%) and Continental Asia (4%). You can watch the webinar on [YouTube here](#).

Conference Presentations

Action Indonesia was well represented at conferences this year, with presentations delivered in person, with many more opportunities to discuss collaboration on specific projects and support than in previous years. The GSMP progress was presented in the below conferences.

- Joint TAG Chairs Meeting, Long Beach, USA, April
- AZA mid-year meeting Ungulate TAG, Long Beach, USA, April
- BIAZA Mammal Working Group, Chester Zoo, UK, May
- EAZA Conservation Forum, Zagreb, Croatia, May
- EAZA Annual Meeting, Albufeira, Portugal, September
- Rakornas, Bali, Indonesia, November
- SEAZA annual conference, Bali, Indonesia, November

In the EAZA Annual meeting, the GSMP progress was presented at the Cattle and Camelid TAG as well as the Pigs and Peccaries TAG meetings. We also held a GSMP meeting, in which each working group was able to update on their plans and have an open discussion.

Resources:

The Education Working Group developed new GSMP resources on Sumatran tigers, and the infographic below that illustrates the progress and collaboration of Action Indonesia since 2016. We also have a [new JustGiving](#) page for small donations or crowdfunding.



Corinne and James presenting at the BIAZA Mammal Working Group conference. Credit: Amy Humphreys

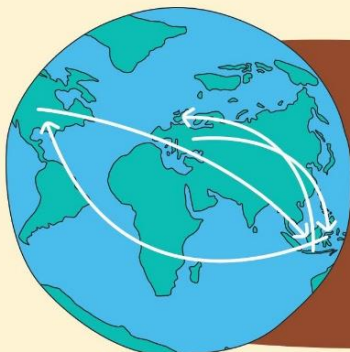


Christina Hvilsom presenting for the Genetics Working Group at the EAZA annual conference. Credit: Corinne Bailey

ACTION INDONESIA

GLOBAL SPECIES MANAGEMENT PLAN

WE ARE WORKING TOGETHER TO SAVE BANTENG, BABIRUSA AND ANOA.



Action Indonesia is the combined Global Species Management Plans (GSMPs) for banteng, babirusa and anoa, working to save these amazing species from extinction.

The plan brings together expertise from around the world from zoos, governments, conservation and research organisations.



ACHIEVEMENTS

Since 2016 we have joined with over 50 organisations to achieve:

Training and development of more than **350** conservation educators and animal care professionals

Four international celebration days, reaching over **3.7 MILLION** PEOPLE globally



Genetic analysis of important breeding animals in Indonesian zoos



Supporting the ex-situ breeding programme with training in best practice

Research and monitoring of in-situ populations



JOIN US

Actionindonesiagsmp.org #ActionIndonesia



3. *In situ* Conservation - Stable and safe *in situ* population

Metapopulation Approach

Banteng Population monitoring in Alas Purwo National Park, East Java

Effective population monitoring of *in situ* populations of the GSMP species is essential to increasing knowledge of population sizes and trends, to identify whether populations are demographically and genetically stable and viable for conservation. Knowledge of population sizes, range and trends also helps to identify potential threats to the population and inform conservation actions. E.g. increased protection for populations vulnerable to hunting pressures.

The GSMPs, PKBSI and Alas Purwo National Park have collaborated since 2019 to monitor banteng populations in a priority location for banteng conservation in East Java. This will allow us to establish how many banteng are in the park, how their population changes over time and the habitats they use. The project is supported by Chester Zoo, Stichting Wildlife Beekse Bergen, Re:wild and Wroclaw Zoo, with the objectives to establish effective monitoring in Alas Purwo National Park, and to support the collation of population data from all four priority areas in Java. In 2021, field teams from Alas Purwo surveyed the entire park for the first time. This activity was repeated successfully in 2022.

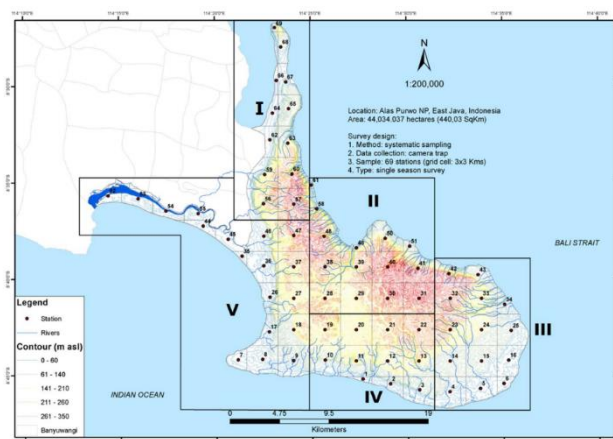


Fig. 4: Camera trap locations in Alas Purwo National Park. Polygons I-V represent the stations covered by each deployment team.



Male banteng photographed during the 2021 camera trap survey. Credit: Alas Purwo National Park.

The camera trapping in 2021 resulted in images of banteng herds, as well as other species such as Javan Leopard, Javan hawk eagle, porcupine, linsang, dhole and many more.

In early 2022, the GSMP supported the data analysis of the 2021 data through statistical mentoring of the technical lead staff in Alas Purwo. Analyst Dr James Waterman delivered one-to-one training in Random Encounter Methodology (REM) and assisted in ensuring robust results.

In the analysis, eight landcover types were identified in the park (Fig 5). Images of banteng were captured in three landcover types: Plantation forest, Primary Forest and Savana, with the highest density by far observed in the Savana area (Fig. 5). When we calculate density by landcover type and sum the resulting population estimates, we arrive at a population estimate of 256 banteng \pm 36

individuals. However, we recommend referring to the density estimates rather than the population estimate, as this is most accurate. Figure 5 shows the density of banteng between habitat types.

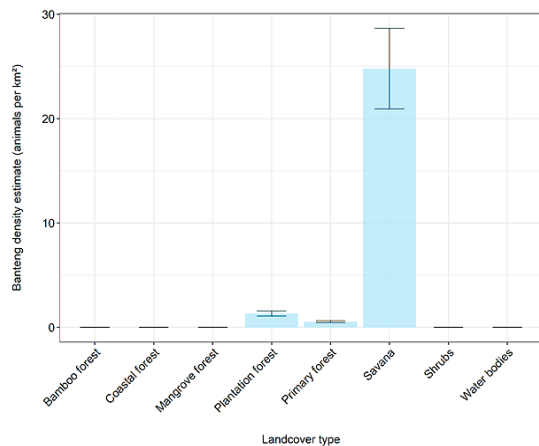


Fig. 5: Density of banteng according to landcover type in 2021.



Juvenile banteng photographed during the 2021 camera trap survey. Credit: Alas Purwo National Park.

Following a technical meeting with deployment staff to discuss lessons learned in 2021 and adjustments to the methodology, 2022 saw the second year of park wide camera trap survey. 69 cameras were once again deployed in September and collected in November for comparable results to the previous year, with the same sampling grid structure used for camera trap placement. The camera trap images are currently being organised and data analysis will be conducted during the first quarter of 2023.



James, Corinne and Yonathan meeting with Alas Purwo National Park Staff in July. Credit: PKBSI

In addition to supporting the surveys in 2022, Action Indonesia and PKBSI also facilitated a wider multi session virtual training course on the basic use of R and R studio in October. The training included data import and cleaning, data manipulation and plotting. 17 participants from Alas Purwo National Park, Baluran National Park and BRIN joined the training. Dr James Waterman conducted the training, with translation assistance from Yonathan and Mia. When asked, all participants reported an increase in confidence and knowledge in using R and R Studio following completion of the course.

Banteng Multi-park Technical Call:

In August, KKH and PKBSI held a technical call with the four national parks: Alas Purwo National Park, Ujung Kulon National Park, Meru Betiri National Park, and Baluran National Park. The meeting included opening statements by Ibu Badiah and Ibu Desy from KKHSG, and was moderated by Professor Gono Semiadi. This technical call was an opportunity to introduce the parks to the GSMP and to discuss the banteng metapopulation approach; a concept which allows all the different populations of banteng to be managed as one single population, thus increasing their genetic diversity and resilience.

During the meeting, each park discussed their progress with population monitoring of banteng until 2022, any challenges, and agreed to work together towards standardising monitoring methods to gather comparable island wide population data for at least 3 years. The idea of collecting genetic samples from each park to support a Population Viability Analysis process in 2025 was introduced during this call and discussed in more detail with three parks during in person meetings in November. A further technical call that focusses on the logistics and technical aspects of genetic sampling was held on the 16th January 2023.



The PKBSI- GSMP coordination team met with Baluran National Park (left) and Meru Betiri National Park (right) to discuss the banteng population monitoring and the genetic sampling concept. Credit PKBSI

Population Monitoring of anoa and babirusa in Sulawesi

Anoa and babirusa are threatened by habitat loss and hunting, causing population declines. Accurate population estimates are lacking, however, as there have been no island-wide (or regional) surveys for these species to date, which hinders conservation efforts. In 2022, the Action Indonesia GSMPs

and PKBSI worked to develop relationships and plans to establish a long-term population monitoring programme in at least one protected area of Sulawesi.

As this is the first time that the GSMP has supported *in situ* monitoring projects in Sulawesi, it has been essential to dedicate a lot of time to building relationships and identifying priority areas that are suitable for multi-year monitoring activities. Multiple calls between the Action Indonesia coordination team and *in situ* practitioners succeeded in receiving updated information on current monitoring activities, and based on this we were able to choose and engage with a university partner to conduct monitoring in Faruhumpenai Nature Reserve, a priority area for babirusa and anoa populations. We also discussed with the government and our in-country partners and ascertained the requirements needed to support research in the park.

In December, Corinne, James and Yonathan met with the Faculty of Forestry, Universitas Hasanuddin, who will be leading the survey, and BKSDA South Sulawesi. The positive meetings resulted in a plan to implement camera trapping in mid-2023, following a pilot study in which a small field team will ascertain the terrain and accessibility of moving through the reserve, as this is still unknown.

The implementation of the camera trapping will be carried out by university alumni and BKSDA staff. The GSMP will support with camera traps, and provide technical assistance in the survey methodology, which will use occupancy modelling to achieve data that is comparable with other surveys for these species in Sulawesi. Due to the size and inaccessibility of the area, the survey will take place over two years, and will be completed by mid-2024.

By trialing a monitoring method in one area and building relationships with the relevant authorities and partners in Sulawesi, we aim to scale the project up to more areas holding remnant populations. In addition, the GSMP aims to engage with *in situ* NGOs to better understand the threats to the species and support capacity building in behaviour change and awareness raising approaches.

The project is supported by Toronto Zoo, Nashville Zoo, and the Dr Holly Reed Conservation Fund, Point Defiance Zoo and Aquarium. We also appreciate the fundraising to support this project through Matt Thompson's Cycle Sulawesi fundraiser in 2021 and artist Marcus Burkhardt's collaboration.



The GSMP met with Risma from UNHAS and BKSDA Sulawesi Selatan in December. Credit: PKBSI

Outlook for 2023

Thanks to your support and contributions, we were able to plan ambitious targets for the next three years with confidence. Successes this year with *in situ* monitoring, genetic sampling and husbandry training have demonstrated our ability to collaborate on ambitious activities using a variety of approaches. We are excited to start implementing more of our plans next year, including:

- Successful camera trap monitoring for anoa and babirusa in one site in Sulawesi
- Conduct a programme of husbandry and education training, including a train the trainer workshop for Indonesian practitioners and a tiger husbandry workshop.
- Distribute and support the third round of breeding and transfer recommendations for the GSMP species.
- Increase capacity of the PKBSI GSMP Programme Officer as he begins an MRes in Animal Welfare.
- Genetic sampling of tigers in Indonesian zoos
- Supporting the genetic sampling and population monitoring of banteng in all four parks
- Publishing the GSMP masterplan for 2022-2025

We look forward to the next **Action Indonesia Day on the 13th August 2023**. Please check the [GSMP website](#) and social media pages for updates and resources on how to get involved in Action Indonesia Day this year.

We rely on your support, expertise and funding to carry out our activities. If you are interested in getting involved and want to find out more, please contact either James Burton (jamesaburton@yahoo.co.uk) or Corinne Bailey (c.bailey@chesterzoo.org) of the AWCSG, a Working Group leader (see Table 4 Annex) or one of the GSMP convenors or co-convenors:

- Anoa: Convenor: Terry Hornsey; Co-convenor: Yohana Tri Hastuti
- Banteng: Convenor: Ivan Chandra; Co-convenor: Steve Metzler
- Babirusa: Convenor: Joe Forsy; Co-convenor: Sri Pentawati

**We wish all partners well for the coming months.
We need your help for the 2023 activities – please get in touch!**

Find us on www.actionindonesiagsmp.org or on social media following the links below:



[@IUCN_WildCattle](#)

[Action Indonesia GSMP](#)

[@iucn_wildcattle](#)

[IUCN Asian Wild Cattle Specialist Group](#)

[@action_indonesiagsmp](#)

Annex: Action Indonesia GSMP founding members, working groups and leaders

The Action Indonesia GSMPs were founded by the Indonesian Zoo and Aquarium Association (PKBSI), the European Association of Zoos and Aquaria (EAZA), the Association of Zoos & Aquariums (AZA), the IUCN Species Survival Commission (SSC), the IUCN SSC Asian Wild Cattle Specialist Group (AWCSG) and the IUCN SSC Wild Pig Specialist Group (WPSG) in 2015. In March 2016, they were endorsed by the Indonesian Ministry of Environment and Forestry (KKH) and WAZA.

Below is the list of the thematic Working Groups and their leaders:

Table 3 Action Indonesia GSMP Working Groups and leaders.

Name	Contact details	Affiliation(s)
Anoa Population Management		
John Andrews	jandrews@lpzoo.org	AZA Population Management Centre, Lincoln Park Zoo, USA
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Banteng Population Management		
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Anoa and Babirusa <i>in situ</i>		
James Burton	jamesaburton@yahoo.co.uk	IUCN SSC Asian Wild Cattle Specialist Group, UK
Corinne Bailey	c.bailey@chesterzoo.org	IUCN SSC Asian Wild Cattle Specialist Group & Chester Zoo, UK
Banteng <i>in situ</i>		
Carl Traeholt	cat@zoo.dk	Copenhagen Zoo, Denmark

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Available from:

IUCN SSC Asian Wild Cattle Specialist Group (www.asianwildcattle.org)

Contact:

James Burton, Chair of the IUCN SSC Asian Wild Cattle Specialist Group (jamesaburton@yahoo.co.uk)



Thanks to all the Action Indonesia GSMP partners and supporters

